Cairo University
Faculty of Engineering
Computer Engineering Department

Graded Lab 4

Inheritance & Polymorphism

Class UberRide:

Data members are protected:

- Name: captain name, for professional issues, the company does not accept any name containing digits.
- seatCount: Number of available seats
- plateNb: Plate Number, consists of 3 characters followed by 3 digits
- Price

Member functions:

- Setter for name. Make any needed validations

- takeNewPassenger: checks whether there is available seat and make any needed update.

- Pure Virtual function setPrice

- Getter for Price

- Setter for plateNb. Make any needed validations

- PrintInfo : prints ALL data (Non Virtual ? Virtual ? Pure Virtual? And why)

Class NormalCar:

Inherits from Class UberRide while not changing the type of class members (which inheritance type?)

Additional Data members:

- yearModel: int number of 4 digits (HINT: most recent model is 2024)

Member functions:

- Constructor that takes name, plateNb,yearModel. NormalCars have initially 4 available seats. Make any needed initializations. Remember some validations are already done just use them .

- Setter for yearModel data member.Make any needed validations.

- Setter for Price, this function takes an integer number that can be positive or negative and adds this number to an initial price = 60. A discount of 2.5% is done for cars fabricated before 2010. Make any needed validations so that the final price cannot be negative.

- PrintInfo: prints ALL Car data (HINT: reuse the inherited base-function)

Class SUV:

Inherits from Class UberRide while not changing the type of class members (which inheritance type?)

Member functions:

- Constructor that takes name, plateNb. NormalCars have initially 7 available seats. Make any needed validations and initializations. Remember Validations are already done just use them

- Setter for Price, this function takes an integer number that can be positive or negative and adds this number to an initial price = 100 (since it is more comfortable than a normal car). Make any needed validations so that the final price cannot be negative.

- goTravel, this function adds 20 % to ride price

- Do we need function printInfo here ? if yes, add it

Class UberDatabase:

Data members:

- UberRideArr : Array of 100 UberRide (objects or pointers?)
- Count: count of UberRides currently available

Member functions:

- Constructor: makes all needed initializations

- addUberRide: new captain is available, this function adds new uberRide to the database

- printData: prints data of all UberRides available in the database

- updateUberRide : function that takes an index and return the corresponding element in the UberRideArr. Make any needed validations

MAIN

- Create an **UberDatabase** object
- Create the following objects dynamically
    1. NormalCar('Ahmed','abc123',2023)
    2. SUV('Osman','fde133')
    3. NormalCar('Khaled','mmm444',2009)
    4. NormalCar('Amir','aam879',2017)
    5. SUV('Farid','bbw896')
- Add these objects to the database using the **addUberRide** method
- Create a SUV('Khaled','jk254')
- Update the data of available uberRides calling function **setPrice** with price 10 times the value of the iterator
- Call the **printData** function
- Apply **goTravel** function on array's fifth element
- Print the new price of this car
- Create a NormalCar pointer and make it point to array's third element
- With this created pointer call **Base class** version of function **printInfo**